
Specifications

This chapter outlines the specifications for the MCU and the MCA.

MCU/MCA parameters

The MCU/MCA can communicate with an ISDLX/XDLX over a distance of 3500 feet using 24-gauge D-type inside cable, with an RS-232 DTE over a maximum distance of 50 feet (with speed up to 20,000 bps), and with a V.35 DTE over 4000 feet at 64 Kbps.

It operates at temperatures between zero and 40 degrees centigrade.

RS-232 interface

Optional jumper plugs on the MCU/MCA board help establish the RS-232 interface. The MCU/MCA meets the EIA RS-232C standards for DTE/DCE interfaces. The electrical characteristics of the interface to the ISDLX/XDLX are the same as for the Meridian Modular Telephones.

V.35 interface

The MCU/MCA has a DB25 connector that provides a V.35 interface to V.35 data terminals, conforming electrically to the CCITT V.35 standard and mechanically to ISO-2110. A DB25-V.35 cable connects a V.35 DTE to the MCU/MCA. For jumper settings, see Figure 5 in “Installation and maintenance” on page 63.

In MPH mode, the MCU must be configured as a DTE. For non-MPH applications, the MCU acts like a DCE. For jumper settings, see Figure 6 in “Installation and maintenance” on page 63.

V.25 bis automatic calling

Synchronous data terminal equipment can originate or answer data calls automatically using this feature. V.25 bis can operate in one of two modes:

- 1 Direct call and/or answer controlled by DTE. Automatically originates or answers a call by raising the DTE DTR control lead.
- 2 Addressed call and/or answer authorized by DTE. DTE can instruct the DCE on procedures for originating and answering calls. The MCU/MCA uses nine interchange circuits on the RS-232 or V.35 interface as shown below in [Table 6](#).

Table 6
Interchange circuits

Transmit data	TXD	103	Pin 2
Receive data	RXD	104	Pin 3
Clear to send	CTS	105	Pin 5
Data set ready	DSR	107	Pin 6
Data terminal ready	DTR	108	Pin 20
Ext Tx signal timing		113	Pin 24
Trans signal timing		114	Pin 15
Rec signal timing		115	Pin 17
Ring indicator	RI	125	Pin 22

Video and group four FAX are examples of applications which require the synchronous transmission format that MCU/MCA provides for V.25 bis calling. The video or FAX equipment must ensure that each frame is processed before a new frame is sent.

MCU/MCA supports both the byte-oriented Bisync and the bit-oriented HDLC types of V.25 bis automatic calling protocol.

For synchronous byte-oriented operation, the three-character V.25 commands are encoded in sync format. The frame message field, of variable length, contains the control or command encoded in IA5 characters, each of which includes a 7-bit code and an odd parity bit.

The message exchange between the MCU/MCA and DTE is asynchronous and balanced. MCU/MCA responds to DTE with an indication or a DSR assertion. MCU/MCA issues an invalid indicator and/or does not assert DSR lead if it detects an erroneous frame start or other problem.

MCU/MCA in V.25 bis mode supports these commands for both Bisync and HDLC protocols:

- CRN: call request with number provided. DTE sends to MCU/MCA to initiate call.
- CIC: connect incoming call. DTE instructs MCU/MCA to answer a call.
- INC: incoming call indication. MCU/MCA sends to DTE to signify incoming call detection.
- INV: invalid indication. MCU/MCA has received a DTE command that it does not support, or a valid command followed by invalid parameters.

DTE tells MCU/MCA to respond to a CRN or CIC command. If the receiving unit is busy or out of order, DTE receives no indication and drops DTR to release the call after thirty seconds.

Telephone interface

The MCU connection to the ISDL or XDLC uses a six-position jack mounted on the rear of the housing at the position labeled “line.” The MCA is connected to the Meridian Modular Telephone.

A five conductor cord connects the main assembly of the MCU to the power supply, which is external to the MCU. The MCA installed in a phone set with a date code prior to January 1998 requires the installation of power supply board. In January 1998 the MCA is available with a redesigned footstand that eliminates the need for a power supply board.

Synchronous mode

In Synchronous mode, the MCU/MCA transmits data at 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 38400, 40800, 48000, 56000 (the default) or 64000 bits per seconds.

Asynchronous mode

In Asynchronous mode, the MCU/MCA transmits data at 110, 150, 300, 600, 1200, 2400, 4800, 9600 (default), or 19200 bits per second. After start up, speeds and parity are then determined by an autobauding and autoparity routine in the firmware.

MCU power supply

An external power supply is supplied with the MCU.

An optional 220 V/50 Hz powered MCU is available (A0318291) for the international market. For MCU power requirements, see [“Power requirements” on page 61](#).

MCA power supply

When installing an MCA to an NTZK or NT2K phone set with date code prior to January 1998 it requires a Power Option board and a power source.

When installing an MCA in an NT9K phone set or an NT2K with date code of January 1998 you will only install the MCA (an additional Power Option board is not required). For detailed power requirements, refer to *Telephone and attendant console installation* (533-3001-215).

EIA RS-232 leads

[Table 7](#) shows the EIA leads supported by the MCU/MCA.

Table 7
EIA signals supported by MCU/MCA (Part 1 of 2)

Circuit number		MCU/MCA DB-25	Signal source		Abbrev.	Description
EIA	CCITT	Pin No.	DTE	MCU/MCA (DCE)		
AA	101	1				Protective Ground *
BA	103	2	X		SD	Transmitted Data
BB	104	3		X	RD	Received Data
CA	105	4	X		RTS	Request to Send
CB	106	5		X	CTS	Clear to Send
CC	107	6		X	DSR	Data Set Ready
AB	102	7		X		Signal Ground
CF	109	8		X	CD	Carrier Detect
		9/10				no connection
SBA	118	11	X			Sec. Trans Data*
SBB	119	12		X		Sec. Rec. Data*
		13/14				no connection
DB	113	15		X	SCT	Transmitted Data Clock

Table 7
EIA signals supported by MCU/MCA (Part 2 of 2)

Circuit number		MCU/MCA DB-25	Signal source		Abbrev.	Description
EIA	CCITT	Pin No.	DTE	MCU/MCA (DCE)		
DD	128	16			SCR	no connection
		17		X		Received Data Clock
		18/19				no connection
CD	108.2	20	X		DTR	Data Terminal Ready
		21				no connection
CE	125	22		X	RI	Ring Indicator
CH/CI	126	23	X			Data Rate Select
DA		24	X			External Transmit Clock
BO		25	X			Busy Out **

*These signals are only supported by the MCA secondary channel for VCO and transparent mode commands.

** Pin 25 is connected to an RS-232 receiver on the MCU/MCA, but is ignored by the MCU/MCA controller

CCITT V.35 leads

- [Table 8](#) shows the V.35 (CCITT) leads supported by the MCU/MCA. An adapter cable is needed to convert the ISO 2110 (DB-25) into an ISO 2593 (34-pin cable)
- For DTE equipped with female ISO-2593, Adapter cable number A0408928* is required.
- For DTE equipped with male ISO-2593, Adapter cable number A0408927* is required.

Table 8
V.35 CCITT signals supported by MCU/MCA (Part 1 of 2)

V.35 CCITT	MCU/MCA DB-25 Pin No.	Abbrev	Adapter cable		Signal Source		Description
			DB-25 Pin No.	V.35 Pin No	DTE	MCU/MCA (DCE)	
101	1	DG	1	A			Protective Ground
103A	2	SDA	2	P	X		Transmit Data A
104A	3	RDA	3	R		X	Receive Data A
105	4	RTS	4	C	X		Request to Send
106	5	CTS	5	D		X	Clear to Send
107	6	DSR	6	E		X	Data Set Ready
102	7	S	7	B			Signal Ground
109	8	CD	8	F		X	Carrier Detect
—	9/10	—	9/10	CC/L			no connection
—	11	—	11	K	X		*
115B	12	SCR B	12	X		X	Serial Clock Receive B
103B	13	SDB	13	S	X		Transmit Data B

Table 8
V.35 CCITT signals supported by MCU/MCA (Part 2 of 2)

V.35 CCITT	MCU/MCA DB-25 Pin No.	Abbrev	Adapter cable		Signal Source		Description
			DB-25 Pin No.	V.35 Pin No	DTE	MCU/MCA (DCE)	
114B	14	SCTB	14	AA		X	Serial Clock Transmit B
114A	15	SCTA	15	Y		X	Serial Clock Transmit A
104B	16	RDB	16	T		X	Receive Data B
115A	17	SCRA	17	V		X	Serial Clock Receive A
—	18	—	18	M	X		Sec Trans Data**
	19		19	HH			no connection
108.2	20	DTR	20	H	X		Data Terminal Ready
—	21	—	21	EE		X	Sec Rec Data**
125	22	RI	22	J		X	Ring Indicator
113B	23	SCTEB	23	W	X		Tran Sign Elemt Time B
113A	24	SCTEA	24	U	X		Tran Sign Elemt Time A
—	25	—	25	MM	X		*
* These leads are ignored by the MCU/MCA controller. ** These signals are only supported by the MCA secondary channel for VCD and transparent mode commands.							

Note: The A0300752 or A0300753 cables are still supported unless used with applications similar to IBM front end.

The MCU/MCA may be placed as far from its associated data terminal or computer port as is consistent with EIA RS-232 or V.35 lead specifications.

Power requirements

The MCU is powered from an external power supply. The MCA for the international market is powered by the Meridian Digital Telephone. The MCA for the North American phone sets with date code prior to 1998 are powered by an optional power supply source installed within the telephone set. If you have an NT9K or NTZK phone set with a date code of January 1998 or later, you do not need a power option board to operate the MCA. For detailed power requirements, refer to *Telephone and attendant console installation* (533-3001-215). The MCU power requirements are as follows:

Voltage	Tolerance	Current	
		Nominal	Maximum
+5 V dc	±5%	0.8 amp	1.0 amp
+12 V dc	±10%	85 mA	0.2 amp
−12 V dc	±10%	35 mA	0.2 amp

A total of 1.0 ampere is required from the 110 V ac power receptacle.

Environmental

The MCU/MCA should not be operated in an environment conducive to corrosion, discoloration, brittleness, electrical performance degradation, or safety-endangering malfunctions due to environmental stresses. It will operate properly and safely in an operating temperature range of 0 to 50 C, with humidity between 5 and 85%, low air pressure of 600 mbar, vibration of 5–200 Hz, and RFI susceptibility of five V/M. The unit should survive a drop of 75 cm without damage.

Reliability

The mean time between failure is ten years at a 25 C operating temperature, with a mean time of 15 minutes to diagnose and repair. Field replaceable parts include the line cord (equipped with Teledapt connectors), key caps, labels, external power supply, and display.

MCU/MCA protocols and functional support

MCU/MCA supports the T-Link and DM-DM protocols and facilitates PSDS as described below:

- T-Link, NT's proprietary protocol for transferring either asynchronous or synchronous data over a 64 Kbps digital circuit used by SL-100/DMS 100 data devices.
- DM-DM, an NT proprietary protocol used by Meridian 1 data services.
- PSDS, Public Switched Data Services, help establish a connection between a Meridian 1 and a Central Office or another vendor's PSDS compatible switch.

Protocol adaptation process

Protocol adaptation is transparent to the user.

Internal calls are completed using the DM-DM protocol, except for calls to or from a BRI set (M5317) which will be completed using the T-Link protocol.

External calls must use either the DTI or PRI card. The MCU/MCA steps through each of the protocols that it supports and attempts to make a connection or complete the protocol exchange. If none of the protocols lead to a connection or protocol exchange, the call is released. The first protocol tried is based upon the protocol selection system parameter entered in LD 11. The PSDS protocol is tried as the last protocol if MCU/MCA is configured for synchronous transmission. The MCU/MCA takes about two seconds to go into T-link mode (if DM-DM is not successful), and about 20 seconds to go into PSDS mode (if T-Link handshake is not successful). After the call is released, the originating MCU/MCA reverts back to the original protocol selected by the PSEL parameter in LD 11.